

IN THE CLAIMS:

1. A syringe apparatus comprising:

a barrel;

a plunger movable within said barrel;

a needle assembly attached to an end of said barrel and defining a passageway therethrough;

a deformable base positioned within said barrel adjacent said needle assembly and defining a passage therethrough;

flexible supports included on said deformable base;

energy storage means within said passageway;

a hollow needle passing through said passageway;

an enlarged head on said needle engaged within said passage of said deformable base; and

a rupturable web on an end of said plunger for moving a fluid within said barrel through the hollow of said needle when said plunger is moved through said barrel toward said needle assembly;

whereby when said plunger moves through said barrel toward said needle assembly, a fluid can be moved from said barrel through the hollow of said needle, and continued movement of said plunger flexes said supports and moves said deformable base downwardly until such time as sufficient force is imparted to said rupturable web by said enlarged head of said needle to tear said rupturable web, said deformable base then releasing said needle with said enlarged head due to force applied thereto by said energy storage means to project said needle with said enlarged head into the interior of said plunger.

2. The apparatus according to claim 1 wherein said enlarged head is generally matingly engaged by said deformable base.

3. The apparatus according to claim 1 wherein said plunger is hollow on the interior thereof for receipt of said needle and said enlarged head and further comprising means within said plunger for capturing said enlarged head of said needle when it is projected thereinto.

4. The apparatus according to claim 1 wherein said energy storage means is a spring.

5. The apparatus according to claim 1 wherein said flexible supports constitute an end of said deformable base and each includes an engaging flange on an end thereof.

6. The apparatus according to claim 5 wherein said deformable base is fitted against a shelf defined within said barrel at an end of said deformable base opposite said flexible supports.

7. The apparatus according to claim 1 wherein said flexible supports contact an end of said needle assembly.

8. The apparatus according to claim 1 wherein said rupturable web is part of a boot positioned over said end of said plunger.

9. The apparatus according to claims 1 or 3 wherein said rupturable web comprises at least one tear groove.

10. The apparatus according to claim 1 wherein said enlarged needle head comprises a flat and diametrically cylindrical top.

11. The apparatus according to claim 1 wherein said enlarged needle head comprises a top having a concave surface.

12. The apparatus according to claims 1 or 10 wherein said enlarged needle head is generally cylindrical and includes a plurality of areas diametrically wider than a remainder of said enlarged needle head.

13. The apparatus according to claim 1 wherein said needle assembly is attached to said barrel whereby said needle assembly partially extends into said barrel.

14. The apparatus according to claim 13 wherein said plunger has an enlarged operating head which is matingly receivable within an end of said barrel opposite said needle assembly.

15. The apparatus according to claim 1 further comprising a plunger seal for providing a liquid impervious seal between said plunger and said barrel at an end of said barrel opposite said needle assembly when said operating head of said plunger is received within said barrel.

16. The apparatus according to claim 15 wherein said plunger seal is an O-ring positioned within a groove on said plunger.

17. The apparatus according to claim 1 further comprising a needle guard positioned over said needle assembly.

18. The apparatus according to claim 17 further comprising a closing member for attachment to an end of said needle assembly to provide a liquid impervious seal therebetween, and wherein said closing member is removably attached to an end of said needle guard at an angle whereby said closing member can be

attached to said needle assembly and removed from said needle guard without handling said closing member.

19. The apparatus according to claim 1 wherein said barrel has indicia thereon which is positioned above said deformable base when said rupturable web is intact.

20. The apparatus according to claim 19 wherein said indicia and said deformable base are of substantially identical colors.

21. The apparatus according to claim 20 wherein said boot is a contrasting color to a color of said indicia.

22. The apparatus according to claim 1 further comprising means for revealing an indicia on said barrel.

23. A syringe apparatus comprising:

a barrel;

a hollow needle extending from an end of said barrel;

a plunger movable within said barrel for moving a fluid out of said barrel through said needle;

said plunger receivable within an end of said barrel opposite said needle; and

a seal for providing a liquid impervious seal between said plunger and said barrel approximately at an end of said barrel opposite said needle.

24. The apparatus according to claim 23 wherein said seal is an O-ring positioned within a groove defined on said plunger.

25. The apparatus according to claim 23 wherein said seal is a ring formed integrally as a part of said plunger.

26. A syringe apparatus comprising:

a barrel having an indicia thereon;

a hollow needle extending from an end of said barrel;

a plunger movable within said barrel; and

means for making said indicia readable by movement of said plunger within said barrel.

27. The apparatus according to claim 26 wherein said barrel is generally transparent and said means for making said indicia readable comprises moving a component associated with said plunger of contrasting color to a color of said indicia below said indicia by movement of said plunger to make said indicia readable.

28. A syringe comprising:

a barrel having a first end and an opposite second end;

a plunger having a forward end and movable within said barrel from said second end of the barrel towards said first end, the plunger having a hollow interior communicating with said forward end;

a deformable base within said barrel intermediate said first and second end;

a hollow needle having a pointed front, said needle extending through said first end of said barrel and a rear end received within and supported by said deformable base;

energy storage means positioned in said barrel between said first end said deformable base and in engagement with said needle; and

a rupturable web on said forward end of the plunger;

wherein a fluid can move from within said barrel through said needle as said plunger moves through said barrel to said deformable base, and when said rupturable web contacts said deformable base, continued movement of said plunger moves said deformable base toward said first end, said rear end of said needle thereby tearing said web wherein said rear end loses contact with said deformable base to allow said energy storage means to eject said needle into said interior of said plunger.

29. The apparatus according to claim 28 wherein said deformable base comprises flexible supports at an end thereof closest to said first end of said barrel.

30. The apparatus according to claim 29 further comprising a needle assembly attached to said first end of said barrel, said needle passing therethrough, and wherein said flexible supports are positioned against an end of said needle assembly opposite said pointed front prior to needle ejection.

31. The apparatus according to claim 30 wherein said deformable base and said needle assembly are of sizes so that said flexible supports can flex to surround said needle assembly and said needle assembly can pass within said deformable base as said deformable base moves toward said first end.

32. A process for retracting a needle upon completion of subcutaneous injection with a hypodermic syringe comprising the steps of:

forcing a plunger of a syringe downwardly within said syringe to force a deformable base engaging a head of said needle downwardly around said head;

forcing an end portion of said head to tear a base portion of said plunger; and

propelling said needle into a hollow of said plunger.

33. The process according to claim 32 wherein said deformable base includes flexible supports and wherein said flexible supports are forced to flex away from one another prior to forcing said deformable base downwardly around said head.

34. The process according to claim 33 wherein said flexible supports are forced against a needle assembly through which said needle passes to force them to flex and wherein said supports flex just enough to pass around said needle assembly.

35. The process according to claim 32 further comprising capturing said needle within said hollow.

36. The process according to claim 32 further comprising sealing said plunger and said syringe to provide a liquid impervious seal to prevent any liquids therein from exiting.

37. The process according to claim 32 further comprising revealing a predetermined indicia on said syringe after said needle has been propelled into said hollow.

38. A process for plugging a passage left open by needle ejection in a syringe comprising the steps of:

providing a syringe having a passage with an opening left open by needle ejection;

providing a needle guard for covering said needle prior to needle ejection, said needle guard having a closing member for closing and sealing said passage opening attached thereto at an angle;

sealing off said passage opening by grasping said needle guard and attaching said closing member to said passage opening; and

removing said needle guard from said closing member.

39. The process according to claim 38 wherein the step of sealing off said passage opening is accomplished wherein a user's hands and fingers remain behind said passage opening.

40. A process for retracting a needle at the completion of subcutaneous injection with a hypodermic syringe, comprising the steps of:

forcing a plunger of said syringe downwardly to force a needle support deformable base downwardly and sever sacrificial supports;

forcing an end portion of said needle to tear a base portion of the plunger; and

propelling said needle into a hollow of said plunger such that said needle is contained entirely within said plunger.

41. A syringe comprising:

a barrel having a first end and an opposite second end;

a plunger having a forward end and movable within the barrel from the second end of the barrel towards the first end, the plunger having a hollow interior communicating with the forward end;

a deformable base mounted within the barrel intermediate the first and second end;



sacrificial supports in the barrel for supporting the deformable base within the barrel;

a hollow needle having a pointed front, extending through the first end of the barrel and a rear end received within the deformable base;

energy storage means positioned in the barrel between the first end and the deformable base and in engagement with the needle; and

a rupturable boot on the forward end of the plunger;

whereby a fluid is moved from within the barrel through the needle as the plunger moves through the barrel to the deformable base, and when the rupturable boot contacts the deformable base, continued movement of the plunger moves the deformable base toward the first end, the rear end of the needle thereby causing the boot to tear and losing contact with the deformable base to allow the energy storage means to eject the needle into the interior of the plunger.

42. A syringe apparatus comprising:

a barrel;

a plunger movable within said barrel;

a needle assembly attached to an end of said barrel and defining a passageway therethrough;

a deformable base positioned within said barrel adjacent said needle assembly and defining a passage therethrough;

energy storage means within said passageway;

a hollow needle passing through said passageway;

an enlarged head on said needle engaged within said passage of said deformable base; and

a rupturable web on an end of said plunger for moving a fluid within said barrel through the hollow of said needle when said plunger is moved through said barrel toward said needle assembly;

whereby when said plunger moves through said barrel toward said needle assembly, a fluid can be moved from said barrel through the hollow of said needle, and continued movement of said plunger moves said deformable base downwardly until such time as sufficient force is imparted to said rupturable web by said enlarged head of said needle to tear said rupturable web, said deformable base then releasing said needle with said enlarged head due to force applied thereto by said energy storage means to project said needle with said enlarged head into the interior of said plunger.

43. The apparatus according to claim 42 wherein said enlarged needle head is cylindrical.

44. The apparatus according to claim 42 wherein said deformable base is cylindrical.